FIG.1

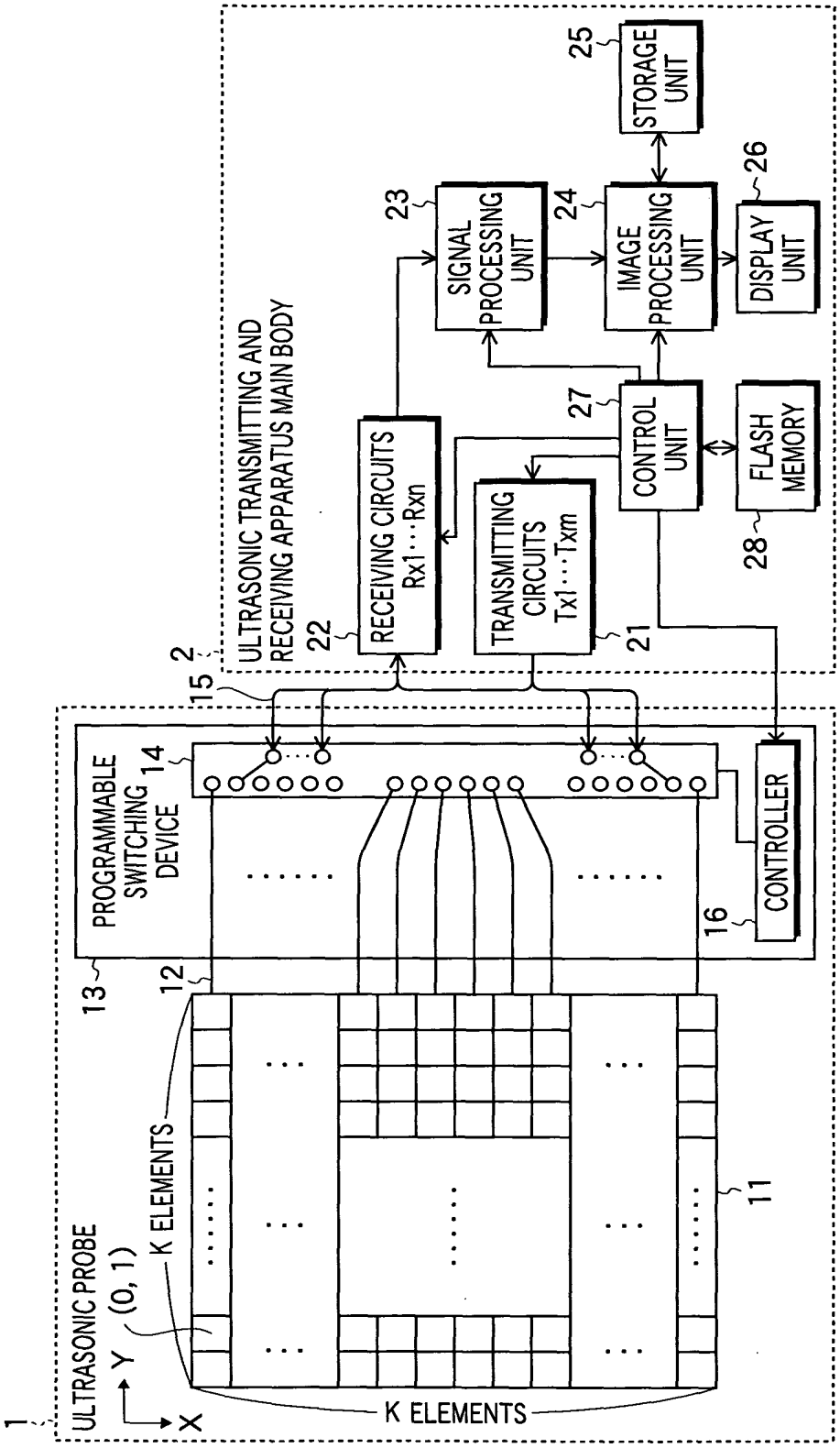

ULTRASONIC PROBE
1
Y
(0, 1)
X
K ELEMENTS
K ELEMENTS
11
12
13
PROGRAMMABLE SWITCHING DEVICE
14
15
16
CONTROLLER
2
ULTRASONIC TRANSMITTING AND RECEIVING APPARATUS MAIN BODY
RECEIVING CIRCUITS Rx1···Rxn
22
TRANSMITTING CIRCUITS Tx1···Txm
21
23
SIGNAL PROCESSING UNIT
24
IMAGE PROCESSING UNIT
25
STORAGE UNIT
26
DISPLAY UNIT
27
CONTROL UNIT
28
FLASH MEMORY

*FIG.2*

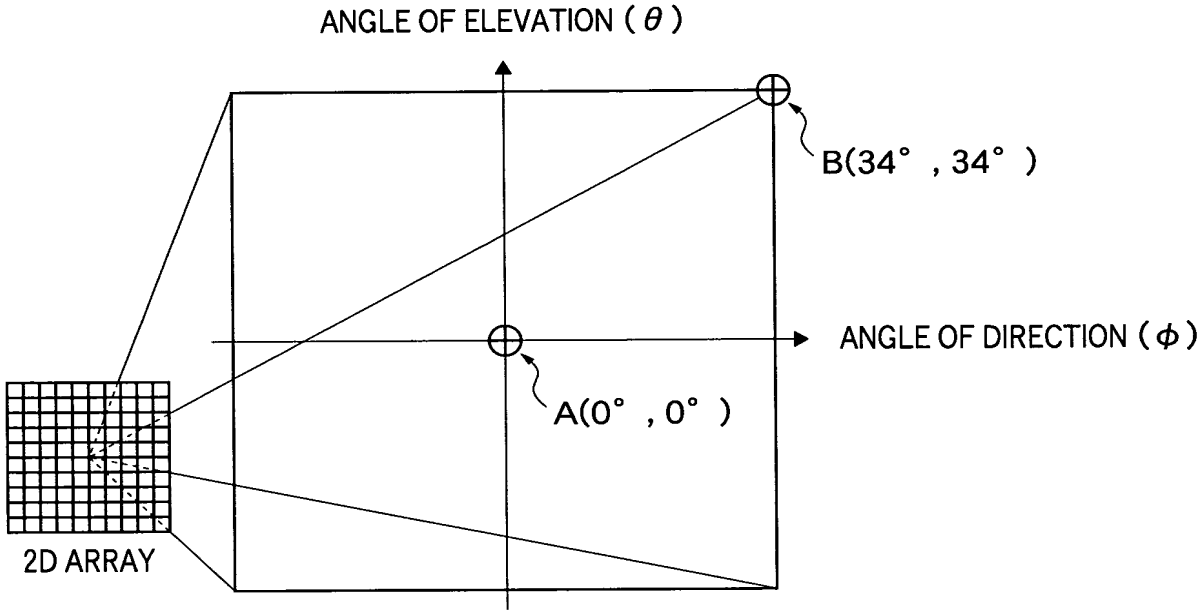
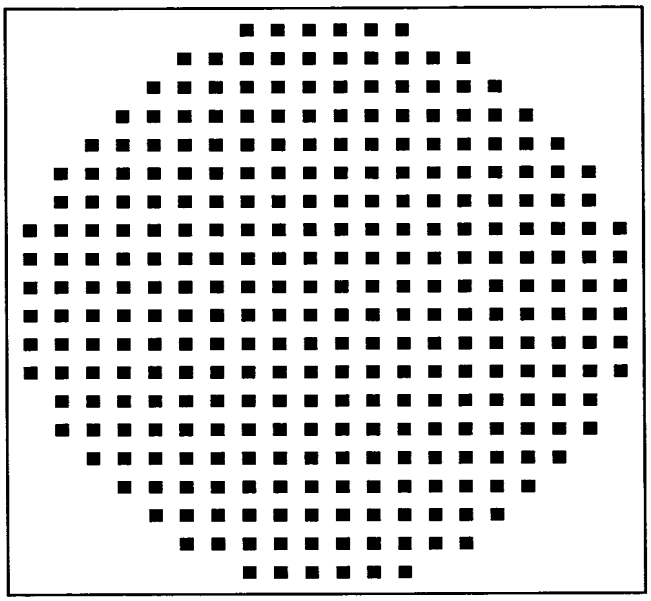
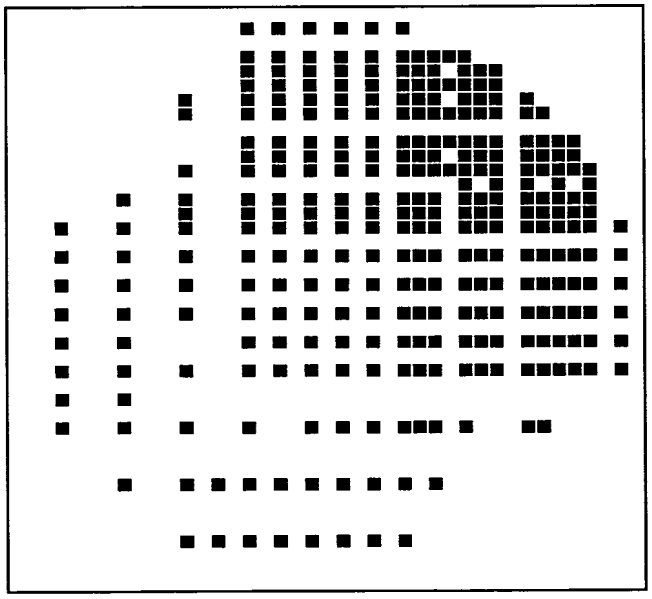


*FIG.3A*



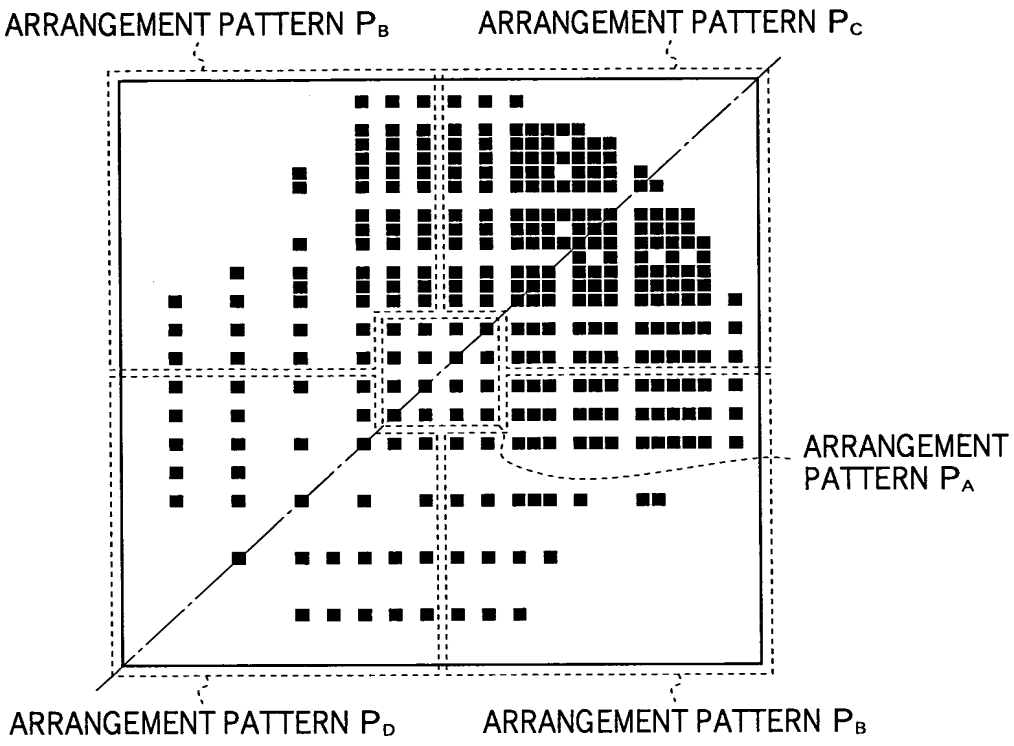
SPARSE PATTERN 1

*FIG.3B*



SPARSE PATTERN 2

*FIG.4*




SPARSE PATTERN 2

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*FIG.5A*

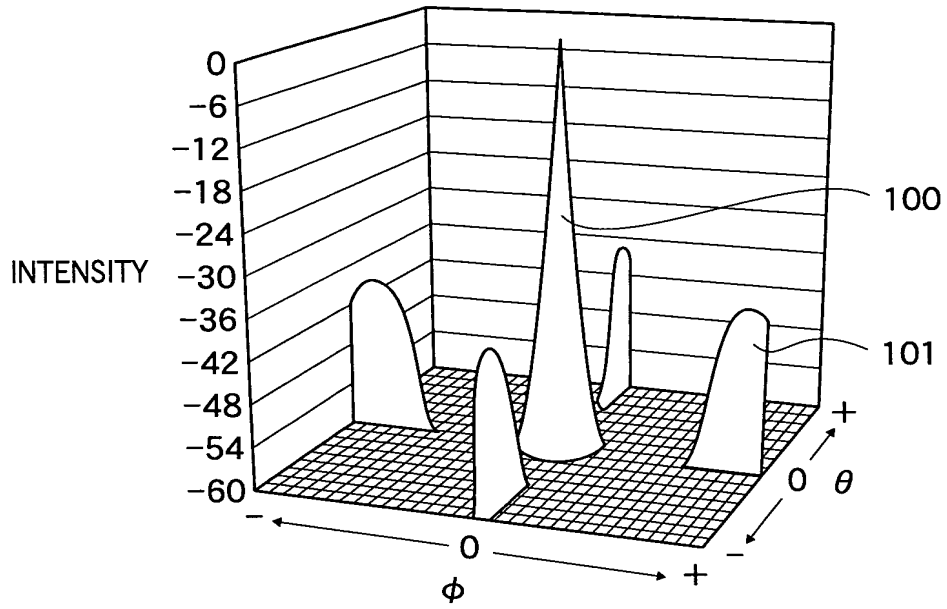


*FIG.5B*

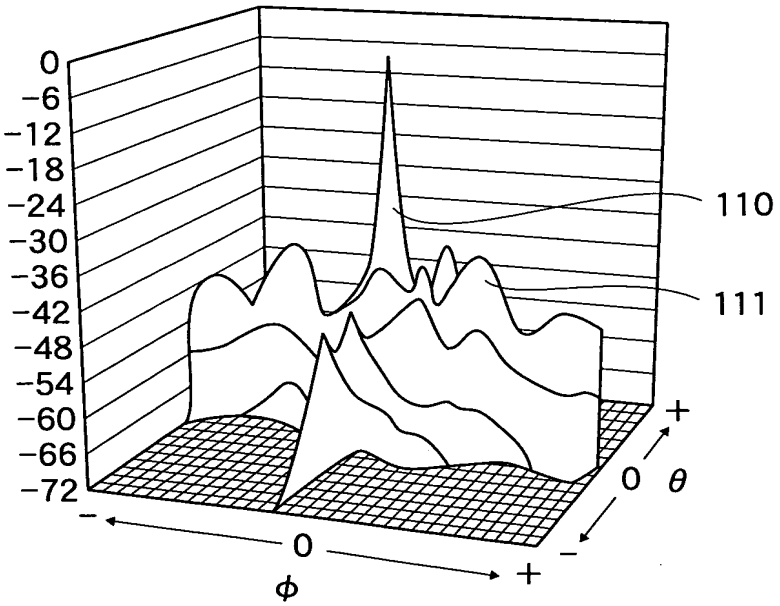

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*FIG.6A*

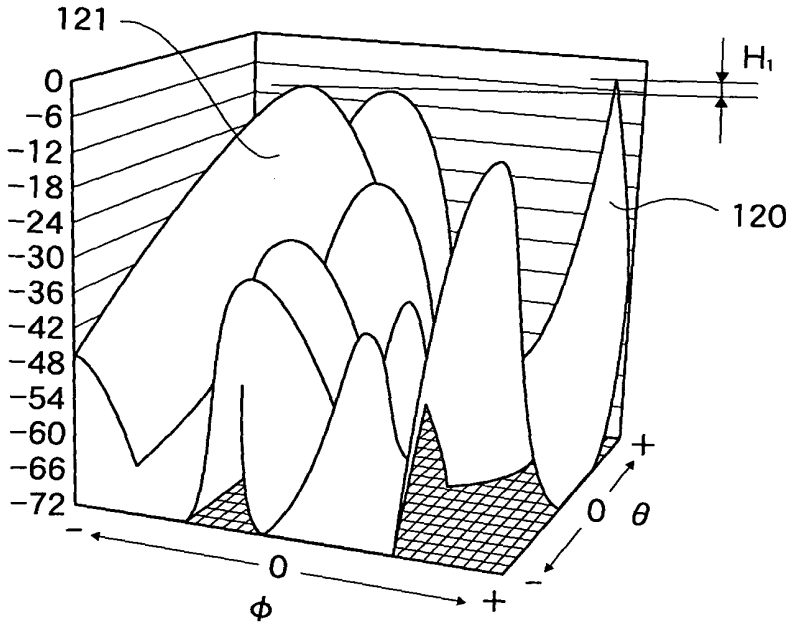


*FIG.6B*

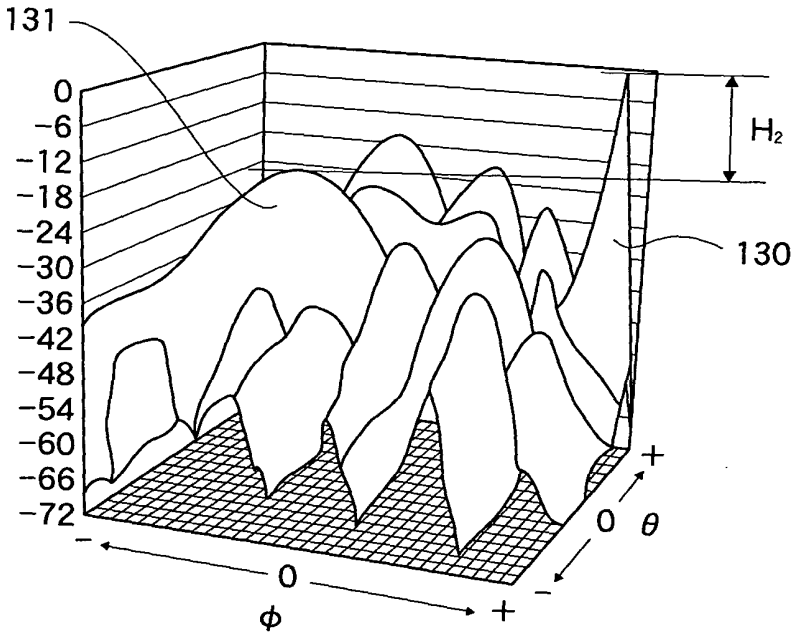

*FIG.7*

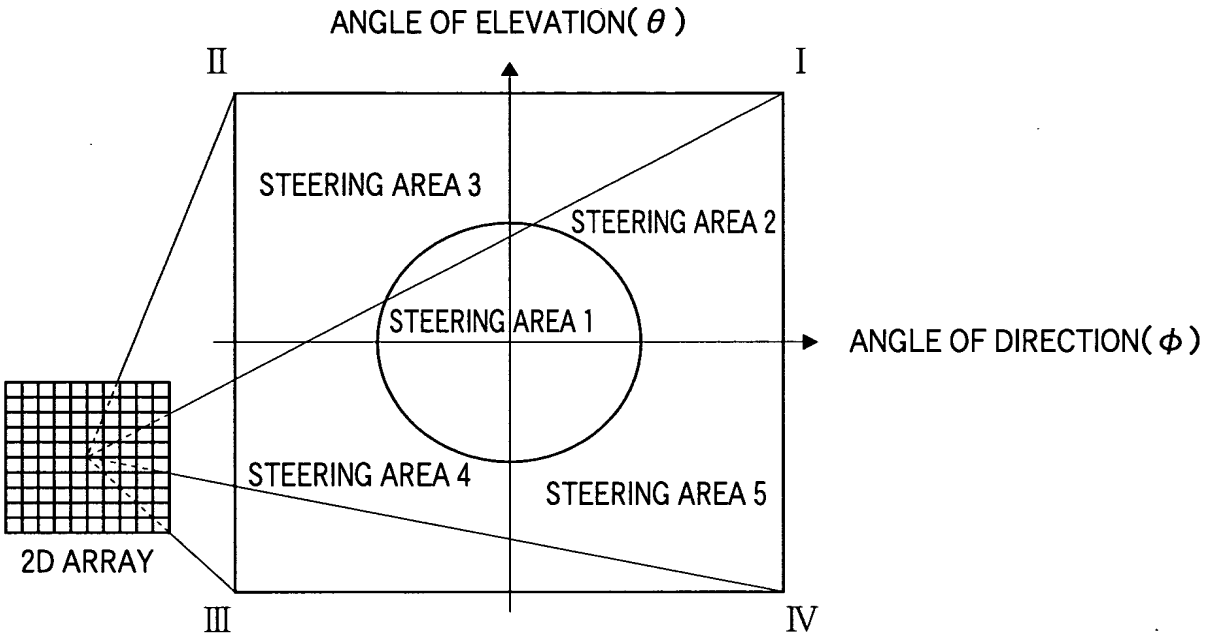
ANGLE OF ELEVATION( θ )
II
I
STEERING AREA 3
STEERING AREA 2
STEERING AREA 1
ANGLE OF DIRECTION( φ )
STEERING AREA 4
STEERING AREA 5
2D ARRAY
III
IV

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*FIG.8*

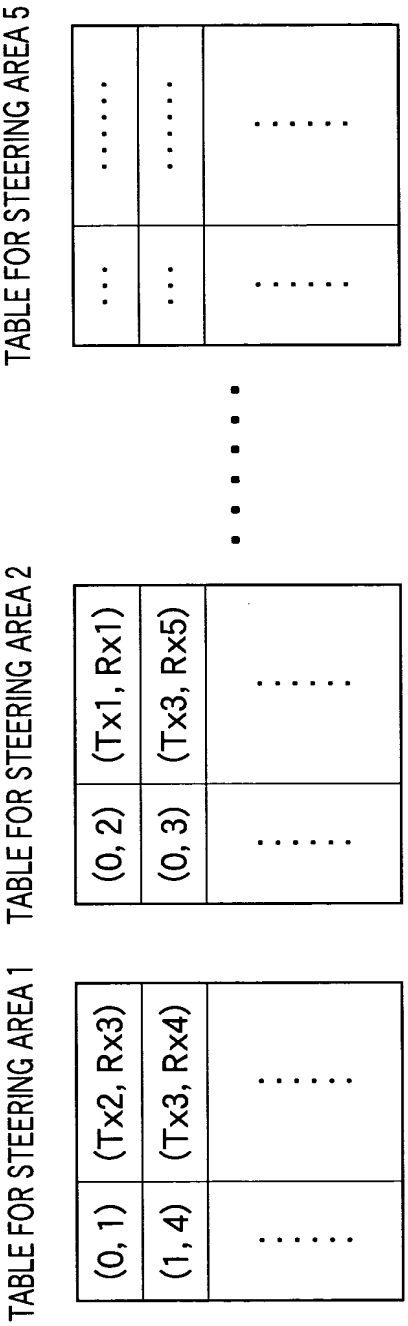
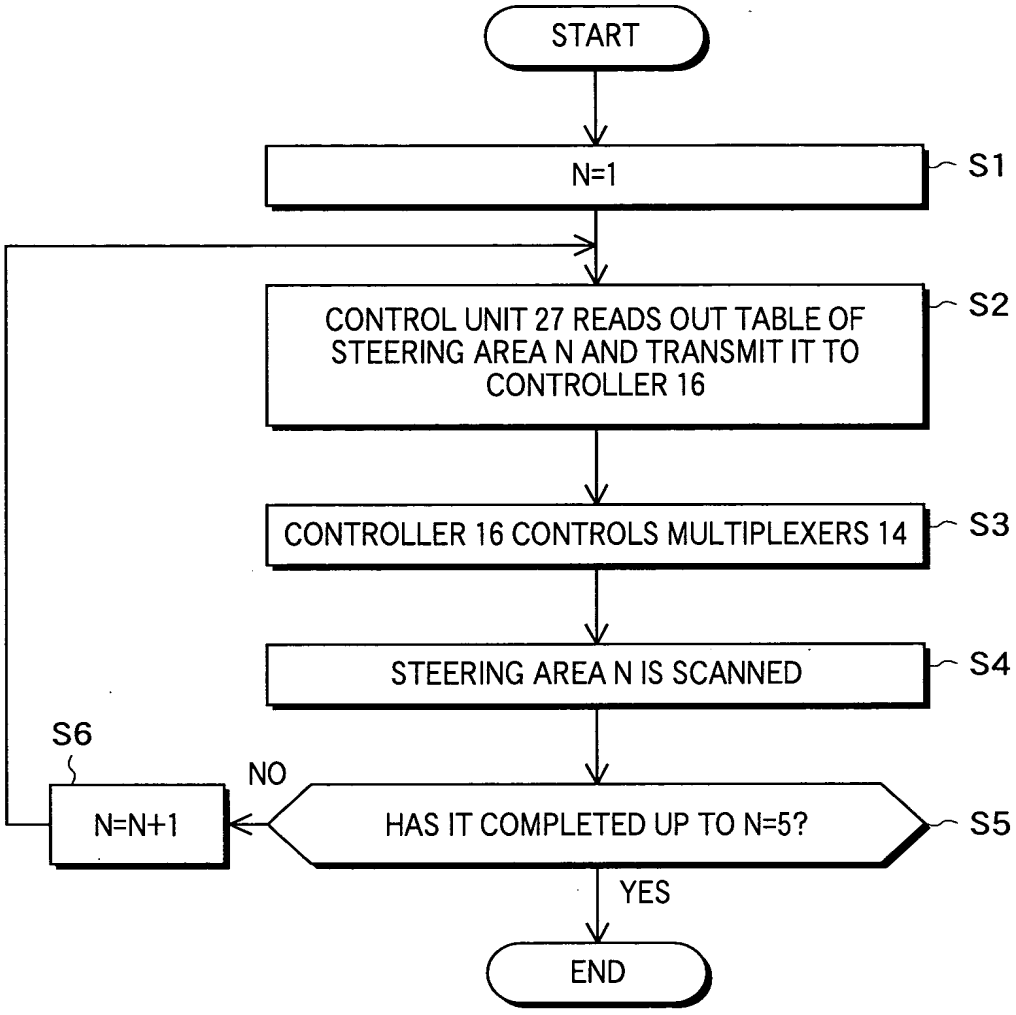


*FIG.9*


START
N=1
S1
CONTROL UNIT 27 READS OUT TABLE OF STEERING AREA N AND TRANSMIT IT TO CONTROLLER 16
S2
CONTROLLER 16 CONTROLS MULTIPLEXERS 14
S3
STEERING AREA N IS SCANNED
S4
S6
NO
N=N+1
HAS IT COMPLETED UP TO N=5?
S5
YES
END